

# Release A CDR RID Report

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Document Release A Availability Predictions

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Section 5.3.2

Page

Figure Table

Category Name Hardware

Actionee ECS

Sub Category

Subject Serialization and Parallelization of Devices in RMA

## Description of Problem or Suggestion:

The method of considering certain devices to be strictly serial or parallel within the RMA modeling leads to disproportionate effects of certain hardware devices in the overall functional RMA. Two examples from the RMA for Archiving and Distributing Data at the GSFC DAAC are given below.

Example 1: The 9-track, CD-ROM, and parallel pair of 8mm drives are considered serially within the RMA for this function. Essentially the model assumes that if the 9-track drive is down, the whole Archive and Distribution function is down. However, the demand for 9-track is so low that the probability of a 9-track request coinciding with a 9-track period of unavailability is extremely small. For similar reasons (low demand), the duty cycle for 9-tracks will be much less than 8mm. Thus the actual influence of 9-track RMA on overall functional RMA will be much less than the predicted influence. This becomes a factor if we are boosting functional RMA elsewhere through RAID purchases (for example) to compensate for the supposed (but largely fictional) hit that a single 9-track will cause to the functional RMA.

Example 2: The two NTP drives in the archive robot are parallelized. However, if one of them is down, either archive \*or\* distribution from that device can take place at any given time, but not both. Performance is likely to be degraded by more than the simple factor of 2 that would seem to be indicated. Experience with a multi-drive Metrum robot suggests that a number of drives are needed to maintain throughput and prevent thrashing, especially when those drives have a low MTBF (3000 hours for the NTP ones!?)

## Originator's Recommendation

Add weighting factors to RMA inputs based on expected duty cycle. Establish a minimum threshold of working devices for multiple-function areas, such as 2 in the archive server to qualify as available. Reevaluate RMA drivers to purchases of RAID and other redundant equipment based on these recalculations.

## GSFC Response by:

## GSFC Response Date

HAIS Response by: Bang Nguyen / Gary Roth

HAIS Schedule 9/20/95

HAIS R. E. Bang Nguyen /

HAIS Response Date 9/22/95

Current availability models have already taken the duty cycle for all the peripherals in the DIPHW CI into consideration. These duty cycles are best engineering estimates and are based on conversations with current DAAC site personnel. These duty cycles are 5% for the 6250 Tape Drive and 10% for the CD-ROM.

RAID is used in most instances mainly because disks have a relatively high failure rate and to assure data integrity during and after a failure. The use of RAID disks is a logical choice since it is redundant unto itself allowing hot swappable disks as well as power supplies. When using RAID-5, the data itself is not lost upon failure and when a disk is replaced the unit automatically reconfigures itself to the level 5 RAID configuration keeping the data intact. The use of RAID in the DIPHW not only improves availability but assures the integrity of the data and provides a suitable collection/queuing area for the data products awaiting transfer to hard media during times of unstaffed operation. This data could be replaced if lost but this would increase the data traffic on the LAN and would create a distribution backlog.

The NTP tape drives are fully redundant for the Release A architecture. Based on data modeling results, one tape drive can handle the required load for the archive. The second drive is there only as a redundant backup, not for performance.

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Page: 1

Official RID Report

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